CEREAL RUST BULLETIN

Report No. 3
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Issued by:

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- Wheat leaf rust is increasing rapidly in central and north central Texas.
- Stripe rust is increasing in south central and central Kansas and southeastern and south central Nebraska.
- ***Special report*** – national stripe rust update by Xianming Chen.

For original, detailed reports from our cooperators and CDL staff, please visit the Cereal Rust Situation (CRS) reports page on the CDL website or click the CRS link found throughout the bulletin.

Generally, small grain development and spring planting are two or more weeks ahead of normal in areas east of the Rockies. Winter wheat broke dormancy early this year due to warmer than normal temperatures earlier this year. As a result 42% of the winter wheat crop was at or beyond heading by April 22. Overall, 63% of the winter wheat crop was reported in good to excellent condition. Nationally, 82% of the oat crop was planted by April 22, 25% ahead of the five year average; 50% of barley crop was planted, 23% ahead of the 5 year average; and 57% of the spring wheat crop was planted, 38% ahead of the 5 year average.

Wheat stem rust. Not yet reported this year in the U.S.

Wheat leaf rust. Leaf rust is widespread from the southern Great Plains to the east coast.

Texas – Leaf rust levels were low in northeastern Texas fields the second week of April. Growth stages ranged from flowering to grain filling. Leaf rust was widespread and increasing in central and north central Texas the third week of April. Moderate to heavy infections were found throughout the area (see CRS). Wheat in central Texas ranged from soft to hard dough while wheat in north central Texas it ranged from milk to soft dough. Many fields in central Texas were sprayed with fungicides.

Oklahoma – Some, but not all, plots at Stillwater in north central Oklahoma had leaf rust incidences of 40-65% in the second week of April (see CRS). Leaf rust had increased slightly in fields around Stillwater by April 21, but was scarce in most fields. However, some fields of Jagger had severity as high as 80-90S. Wheat was in the kernel forming stage. Leaf rust was increasing in south central Oklahoma the third week in April.

Kansas – In early April low levels of leaf rust were reported in south central and central areas of the state (see CRS).

Louisiana – There have been no new reports of leaf rust from the state since severe leaf rust was reported in plots at the Ben Hur Farm in Baton Rouge in southeastern Louisiana in early March.

Mississippi – Leaf rust was found throughout much of the state by early April (see CRS). Fungicides were applied to fields with susceptible cultivars.

***Arkansas* –** Traces of wheat leaf rust were found scattered about in a few areas of the state by late March. By April 13 leaf rust was widespread in the state and was severe on several lines in southeastern Arkansas. Low levels of leaf rust were found in some susceptible plots at Kibler in northwestern Arkansas on April 17.

***Georgia* –** Leaf rust has been found in commercial fields in southwestern and central Georgia. No rusts were found in commercial fields surveyed around Plains in southwestern Georgia and Griffin in west central Georgia by April 23.

***North Carolina* –** Leaf rust was widespread throughout the Coastal Plain and Tidewater areas by April 13. Low levels were beginning to develop in Rowan County in central North Carolina.

***South Carolina* –** Wheat leaf rust (20% incidence) was found on USG 3209 in Barnwell County in southern South Carolina on April 6.

***Indiana* –** Leaf rust was observed at low incidence and severity in several fields in Gibson County in southern Indiana the second week of April.

Wheat leaf rust map. *Please visit:* (http://www.ars.usda.gov/Main/docs.htm?docid=9757).

Wheat cultivar *Lr* gene postulation database. *Please visit*: Leaf rust resistance gene postulation in current U.S. wheat cultivars.

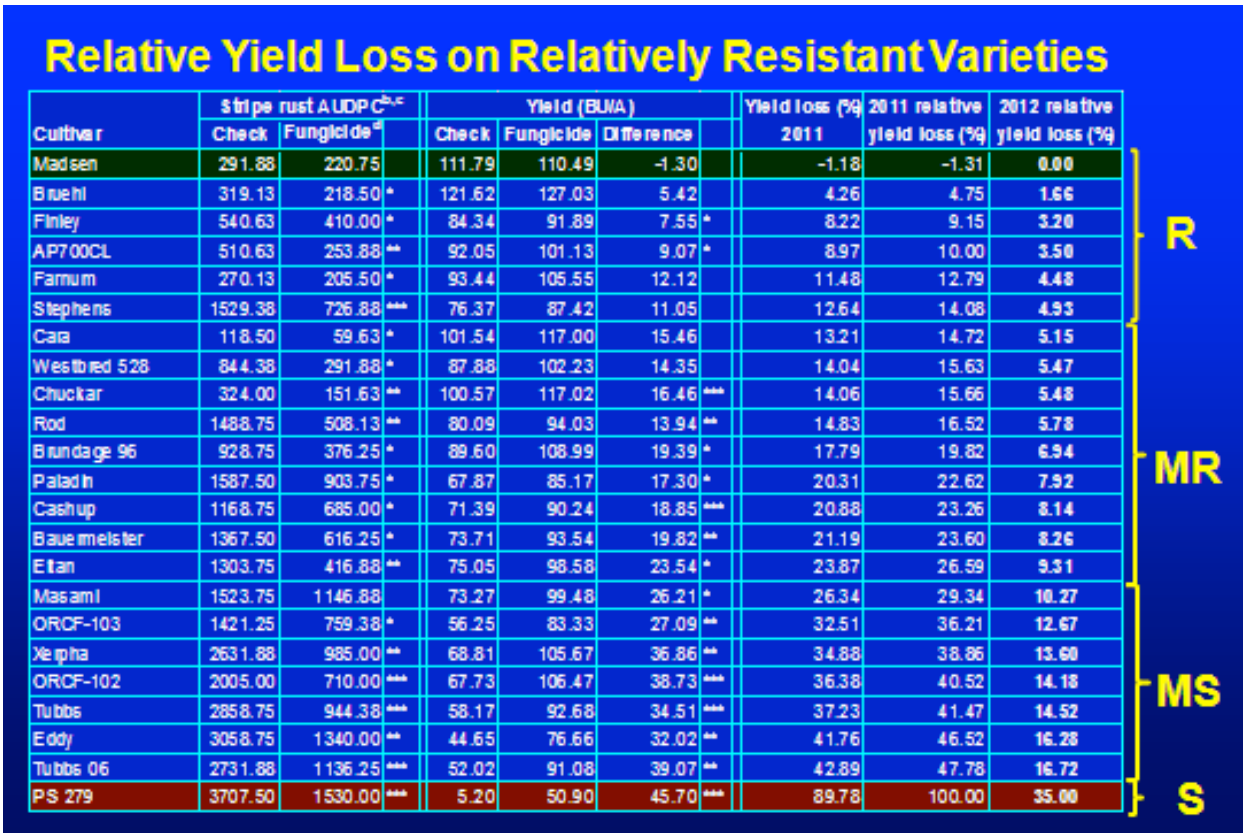
Wheat stripe rust.

Special Report - Stripe Rust Update, April 24
Xianming Chen

Stripe Rust in the Western U.S.
In the Pacific Northwest (PNW), stripe rust this year has been much lower than the rust development in 2011, except for northwestern Washington, stripe rust developed to 100% prevalence and 60% severity on susceptible entries in experimental nurseries by the end of March as always. In western Oregon, stripe rust was observed in a couple of lines in a breeding nursery near Corvallis in the first week of April.
In eastern Washington and northeastern Oregon, stripe rust has started showing up, but still remained hard to find. Since the last update, stripe rust was reported in a field near Precott in the Walla Walla County, WA. Last week, a sample of wheat plants with barley yellow dwarf and crown rot from Horse Heaven Hills region (Benton Co., WA) was found to have a very tiny stripe of stripe rust pustules. Yesterday, stripe rust was reported in an August-planted 'Tubbs 06' field near Ritzville (Adams Co., WA). I got an e-mail that stripe rust was found on lower leaves in an early-September planted 'ORCL 102' field between Precott and Walla Walla. Yesterday, I was checking fields in western Whitman, Columbia, Walla Wall, Franklin, and Adams counties in eastern Washington and around Pendleton and Hermiston (Umatilla Co.) in eastern Oregon. Winter wheat ranged from early jointing (Feeks 4) to early boot (Feeks 10). I only found stripe rust on lower leaves of one volunteer plant in our stripe rust nursery (planted in late September) near Walla Walla. No stripe rust was found on any entries and spreader rows of a highly susceptible genotype. No stripe rust was found in any commercial fields checked including those around Precott and in the Horse Heaven Hills. The observations of just starting stripe rust are about normal time. The stripe rust pressure is much lower than the situation this time of last year, and even lower than that of 2010.
For wheat growers in the eastern PNW, please keep in mind that stripe rust can be different from year to year and this year is definitely different (much lower) from last year, and therefore disease management should not repeat what you did last year. You may able to save fungicide application cost this year. Real control with fungicides should be started from now. Please check your fields before spray. My general

suggestion is no spray without seeing rust and spray when rust reaches to 1 to 5% prevalence (percent of plants with rust pustules). Based on current low stripe rust pressure, susceptible and moderately susceptible varieties (**Table 1**) may just need only one application at the flag-heading stage; and moderately resistant varieties may or not need to spray fungicides (depending upon weather conditions in May). The long-term weather forecast for May to July just issued today predicted a slightly cooler than average (just 1°F difference) for the PNW.

Table 1. Stripe rust reaction groups (R=resistant, MR=moderately resistant, MS= moderately susceptible, and S=susceptible) and predicted yield losses of major winter wheat cultivars grown in the PNW based on last year yield losses and this year prediction of stripe rust damage.



Cultivar	Stripe rust AUDPC[b,c] Check	Stripe rust AUDPC[b,c] Fungicide[d]		Yield (BUA) Check	Yield (BUA) Fungicide	Yield (BUA) Difference		Yield loss (%) 2011	2011 relative yield loss (%)	2012 relative yield loss (%)	
Madsen	291.88	220.75		111.79	110.49	-1.30		-1.18	-1.31	0.00	R
Bruehl	319.13	218.50	*	121.62	127.03	5.42		4.26	4.75	1.66	R
Finley	540.63	410.00	*	84.34	91.89	7.55	*	8.22	9.15	3.20	R
AP700CL	510.63	253.88	**	92.05	101.13	9.07	*	8.97	10.00	3.50	R
Farnum	270.13	205.50	*	93.44	105.55	12.12		11.48	12.79	4.48	R
Stephens	1529.38	726.88	***	76.37	87.42	11.05		12.64	14.08	4.93	R
Cara	118.50	59.63	*	101.54	117.00	15.46		13.21	14.72	5.15	MR
Westbred 528	844.38	291.88	*	87.88	102.23	14.35		14.04	15.63	5.47	MR
Chukar	324.00	151.63	**	100.57	117.02	16.46	***	14.06	15.66	5.48	MR
Rod	1488.75	508.13	**	80.09	94.03	13.94	**	14.83	16.52	5.78	MR
Brundage 96	928.75	376.25	*	89.60	108.99	19.39	*	17.79	19.82	6.94	MR
Paladin	1587.50	903.75	*	67.87	85.17	17.30	*	20.31	22.62	7.92	MR
Cashup	1168.75	685.00	*	71.39	90.24	18.85	***	20.88	23.26	8.14	MR
Bauermeister	1367.50	616.25	*	73.71	93.54	19.82	**	21.19	23.60	8.26	MR
Eltan	1303.75	416.88	**	75.05	98.58	23.54	*	23.87	26.59	9.31	MR
Masami	1523.75	1146.88		73.27	99.48	26.21	*	26.34	29.34	10.27	MS
ORCF-103	1421.25	759.38	*	56.25	83.33	27.09	**	32.51	36.21	12.67	MS
Xerpha	2631.88	985.00	**	68.81	105.67	36.86	**	34.88	38.86	13.60	MS
ORCF-102	2005.00	710.00	***	67.73	106.47	38.73	***	36.38	40.52	14.18	MS
Tubbs	2858.75	944.38	***	58.17	92.68	34.51	***	37.23	41.47	14.52	MS
Eddy	3058.75	1340.00	**	44.65	76.66	32.02	**	41.76	46.52	16.28	MS
Tubbs 06	2731.88	1136.25	***	52.02	91.08	39.07	**	42.89	47.78	16.72	MS
PS 279	3707.50	1530.00	***	5.20	50.90	45.70	***	89.78	100.00	35.00	S

In California, stripe rust has been widespread. Samples collected by collaborators were from Yolo Co. and Kings Co. with severity more than 80% and prevalence up to 80%. Barley stripe rust has been reported in Davis.

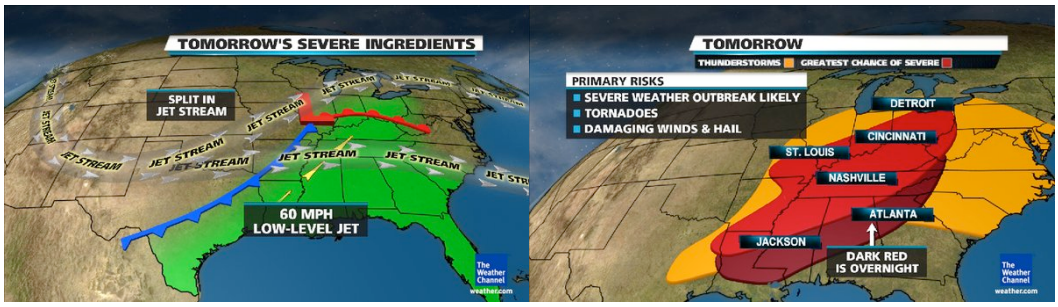
Stripe Rust in the Eastern U.S.

Wheat stripe rust has been widespread in eastern U.S. (states east of the Rocky Mountains). So far, stripe rust has been reported in Arkansas, Mississippi, Texas, Louisiana, Tennessee, Kentucky, Oklahoma, Kansas, Georgia, Illinois, Indiana, Nebraska, and North Carolina. The disease will likely show up in further north states, such as Colorado, South Dakota, North Dakota, Iowa, Minnesota, Ohio, and Virginia; and cereal workers and growers should check fields for stripe rust. The current stripe rust distribution can be traced back to previous storm events (**Fig. 1**). The disease has caused significant damage in the south central states, especially Arkansas and Mississippi; and is causing damage further north. The disease has mostly passed the management period (before flowering stage) and is slowing down in the south-central states (Texas, Oklahoma, Arkansas, Louisiana, and Mississippi). Fungicide applications are still possible

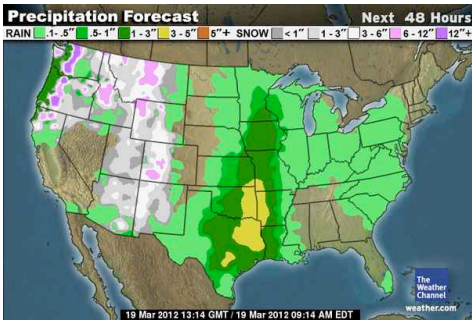
and may be needed in further north and east states. Regarding stripe rust distribution, we will like to see the same situation as in 2010. Rust damage this year appears less than 2010 in the south-central states, thanks to the warm-to-hot weather in March which made adult-plant resistance (mostly also temperature sensitive) relatively effective compared to the wet and cool weather conditions in 2010. It is too early to see damage in the central and possibly northern Great Plains and eastern states as the disease still has potential to cause damage. Fungicides should be used in fields of susceptible varieties with presence of stripe rust. Yield increase of 3 or more bushels per acre should justify application of fungicides.

So far, we have obtained virulence data from eight stripe rust samples, 4 from Arkansas, 2 from Mississippi, and 2 from Texas. All of these isolates were identified as race PSTv-37 (virulent to genes *Yr6*, *Yr7*, *Yr8*, *Yr9*, *Yr17*, *Yr27*, *Yr43*, *Yr44*, *YrTr1*, and *YrExp2*; avirulent to *Yr1*, *Yr5*, *Yr10*, *Yr15*, *Yr24*, *Yr32*, *YrSP*, and *YrTye*), except one isolate (collected from cv 'Beretta' from Arkansas) as PSTv-14 (virulent to genes *Yr1*, *Yr6*, *Yr7*, *Yr8*, *Yr9*, *Yr17*, *Yr27*, *Yr43*, *Yr44*, *YrTr1*, *YrExp2*, and *YrTye*; avirulent to *Yr5*, *Yr10*, *Yr15*, *Yr24*, *Yr32*, and *YrSP*). PSTv-34, which is similar to previous races PST-98 and PST-100, was the most predominant race in 2010, especially in the eastern U.S., and the second popular race in 2011. PSTv-14, one of the top five races in 2010 and 2011, was detected only in the western U.S. in both 2010 and 2011 and appeared to have been spread to the eastern states.

Fig. 1. Storms which may have caused stripe rust spread.



Thunderstorms forecasted or occurred in March 2 and March 3.



Forecast in March 19. (All pictures were from www.weather.com)

----------This ends the special stripe rust update section by Xianming Chen----------

Texas – Cultivar USG 3295, which previously showed good resistance in the field, had heavy stripe rust infection in some fields in northeastern Texas in early April. Perhaps this reflects a race change in the area. Stripe rust was active in central Texas the third week of April, but development appeared to be slowing while leaf rust was rapidly increasing. In north central Texas both stripe and leaf rust were active and increasing (see CRS).

Oklahoma – Stripe rust can still be found around Stillwater in north central Oklahoma, but development has mostly ceased. In south central Oklahoma stripe rust was active and increasing the third week of April. Previously, stripe rust was reported across southwestern, central and west central Oklahoma, but not heavy or severe at any location surveyed (see CRB #2, CRS).

Kansas – Stripe rust has increased in south central and central Kansas since the last bulletin (see CRB #2). The stripe rust is most severe on cultivars previously thought to be resistant, suggesting a race change in the Great Plains (see CRS). Wheat development in Kansas is three weeks ahead of normal, 97% of the crop has jointed and 45% has already headed.

Nebraska – Stripe rust was widespread in fields in southeastern and south central Nebraska in mid-April. Severities from trace to 70% or higher were found on lower leaves in hot spots in the southern-most counties. Trace severities were found in the south central counties surveyed. Incidences ranged from trace to 50%. Most fields were at Feekes 8-9 stage while a few fields were at Feekes 10. Conditions the past week or so have been very conducive for stripe rust development (cool and moist). Low levels of stripe rust were found in plots at Mead and Lincoln in southeastern Nebraska on April 24. The wheat ranged from flag leaf emerged to full heading in the plots.

Louisiana – A few reports of stripe rust were noted in commercial fields in early March, but it does not appear it will be a major disease in the state in 2012 (see CRS).

Mississippi – Stripe rust was still active and rapidly developing in some areas of state the second week of April. The majority of the wheat at the time was well beyond flowering; 13% of the crop was mature by April 22. Rain and cool weather continued through the third week of April.

Arkansas – Stripe rust was still active in plots at Kibler in northwestern Arkansas the third week of April, but development was slowing and telia were appearing. Previously resistant cultivars were infected this year suggesting one or more new races may be present (see CRS). The winter wheat crop was reported 100% headed by April 22.

Tennessee – No new reports from the state. Previously, stripe was increasing in several fields in western Tennessee by late March (see CRS).

Kentucky – No new reports from the state. Previously, traces of stripe rust were found in the state in late April, but warm temperatures at the time appeared to be keeping stripe rust in check**.**

Georgia – Stripe rust was found in a field in Taylor County in east central Georgia in mid April. No rusts were found in commercial fields surveyed around Plains in southwestern Georgia and Griffin in west central Georgia. Wheat is generally in kernel forming or maturing stages.

North Carolina – Wheat stripe was first observed in Robeson County in south central North Carolina in early April. Over the last two weeks stripe rust was widely observed on susceptible cultivars in the Coastal Plain. Stripe rust developed rapidly in fields in Greene County in east central North Carolina by April 20 (see CRS). Recent conditions were conducive for stripe rust development and other outbreaks are anticipated.

Illinois – Stripe rust was observed across several counties in southern Illinois on April 19. Wheat in the southern counties ranged from the onset of heading to flowering.

Indiana – Stripe rust was observed at low incidence and severity in a field in Gibson County in southern Indiana the second week of April.

Idaho – No new reports from the state. Previously, it was reported (early April) that no overwintering stripe rust was found in plots at Aberdeen in southeastern Idaho.

Stripe rust samples
Please send wheat and barley stripe rust collections as soon as possible after collection to:

Dr. Xianming Chen
USDA-ARS
361 Johnson Hall
P.O. Box 646430
Washington State University
Pullman, WA 99164-6430
email: xianming@wsu.edu

Note: Stripe rust collections are vulnerable to heat and do not survive long at warm temperatures; therefore, if shipment of collections for race identification is delayed their viability will be greatly reduced. An overnight courier service is preferred for sending stripe rust collections.

Wheat stripe rust map. *Please visit:* (http://www.ars.usda.gov/Main/docs.htm?docid=9757).

Oat stem rust. There have been no new reports of oat stem rust at locations other than reported earlier (extreme southern Texas and College Station Texas) (see CRB #1).

Oat crown rust. Oat crown rust was found in plots near Raleigh in central North Carolina in early April. This is the first oat crown rust report since it was reported in southeastern Louisiana (early March) and South Texas (late March).

Due to cooler temperatures the last two weeks aecial development on the buckthorn in the Matt Moore Buckthorn Plots at St. Paul, Minnesota has slowed somewhat, however, there is significant infection on the bushes and more infections are expected.

Barley stem rust. Not yet reported in the U.S. this year.

Barley leaf rust. Barley leaf rust was found in a commercial field in Emanuel County in east central Georgia in mid-April. Previously, barley leaf rust was reported in Delaware, Virginia and extreme southern Texas (see CRB #1, CRB #2, CRS).

Barley stripe rust. Not yet reported this year in the U.S.

Rye stem rust. Not yet reported this year in the U.S.

Rye leaf rust. Not yet reported this year in the U.S.

Aecia on barberry. Moderate aecial infection on common barberry (*Berberis vulgaris*) with mature aecia has been observed in southeastern Minnesota. Based on past experiences, aecial infection at this location was mostly due to the rye stem rust pathogen, *Puccinia graminis* f. sp. *secalis*. Moderate to heavy aecial infection on *B. chinensis*, *B. koreana*, and Emerald Carousel (an interspecific hybrid between *B. koreana* and *B. thunbergii*) was observed in Chaska, Minnesota. This is likely due to infections by the stripe rust pathogen (*Puccinia striiformis*) of Kentucky bluegrass (*Poa pratensis*)